

This listing of claims will replace all prior versions, and listings, of claims in the application:

CLAIMS:

1. (currently amended) A nuclear power plant system comprising:
a nuclear reactor;
a steam turbine that uses steam generated in a pressure vessel included in the nuclear reactor; and
a radioactive material separating and removing apparatus placed in the pressure vessel or in a steam passage extended between the pressure vessel and an inlet of the steam turbine to separate and remove radioactive materials from steam and having a surface adapted to trap thereon radioactive corrosion products contained in water drops so that the radioactive corrosion products firmly adhere on the surface, in order to separate and remove the radioactive corrosion products from the water drops.
- A1 2. (original) The nuclear power plant system according to claim 1, wherein the radioactive material separating and removing apparatus has a high-temperature water purifying apparatus employing a metal or a metal oxide, which is stable in an environment in which high-temperature water or high-temperature steam exists, as an ion-exchange material that exchanges ions for radioactive ions.
3. (currently amended) The nuclear power plant system according to claim 1, wherein the radioactive material separating and removing apparatus includes a high-temperature water purifying apparatus employing a superhydrophilic substance capable of trapping water drops as purifying means to purify water.
4. (original) A nuclear power plant system comprising:
a nuclear reactor;
a steam turbine that uses steam generated in a pressure vessel included in the nuclear reactor; and

a radioactive material separating and removing apparatus placed in a reactor water system attached to the nuclear reactor, the pressure vessel or a steam passage extended between the pressure vessel and an inlet of the steam turbine and employing a metal or a metal oxide, which is stable in an environment in which high-temperature water or high-temperature steam exists, as an ion-exchange material that exchanges ions for radioactive ions.

5. (original) The nuclear power plant system according to claim 4, wherein the ion-exchange material is TiO₂ or ZrO₂.

6. (original) The nuclear power plant system according to claim 5, wherein the ion-exchange material is formed in fiber.

7. (currently amended) The nuclear power plant system according to claim 4, wherein the ion-exchange material contains, as a principal material, a ferrite oxide, ~~such as hematite (Fe₂O₃), magnetite (Fe₃O₄) or nickel ferrite (NiFe₂O₄).~~

8. (original) The nuclear power plant system according to claim 4, wherein the high-temperature water purifying apparatus includes a dryer disposed in the pressure vessel, wherein

the dryer is provided with a plurality of corrugated plates defining passages through which a multiphase flow containing radioactive materials flows, and

the surfaces of the corrugated plates are coated with a coating containing TiO₂ as the ion-exchange material and SiO₂.

9. (currently amended) The nuclear power plant system according to claim 4, wherein the high-temperature water purifying apparatus includes a dryer disposed in the pressure vessel, wherein

the dryer is provided with a plurality of corrugated plates defining spaces through which a multiphase flow containing radioactive materials flows, and

each of the corrugated plates ~~are treated by a process of removing n-type semiconductor oxides deposited on the surfaces of the corrugated plates in a predetermined time of operation to expose a p-type oxide film coating the surfaces of the corrugated plates and depositing the ion-exchange material on the surfaces of the~~ corrugated plates is provided thereon with a p-type oxide film and an ion-exchanging material coated on the p-type oxide film.

10. (currently amended) The nuclear power plant system according to claim 4, wherein the high-temperature water purifying apparatus includes a dryer disposed in the pressure vessel, wherein

the dryer is provided with a plurality of corrugated plates defining spaces through which a multiphase flow containing radioactive materials flows, and a means for creating an electric field or a magnetic field between adjacent corrugated plates, and

minute radioactive particles contained in the multiphase flow are biased toward the corrugated plates by the electric field or the magnetic field.

11. (currently amended) The nuclear power plant system according to claim 9, ~~wherein the means for creating an electric field or a magnetic field between the adjacent corrugated plates is powered by further comprising~~ a photocell ~~formed of including:~~

the an n-type semiconductor, which is TiO_2 or ZrO_2 , deposited on the corrugated plates; and

a film of a corrosion product, which is a p-type semiconductor, produced by a corrosion of surfaces of the corrugated plates.

12. (currently amended) The nuclear power plant system according to claim 4, wherein the high-temperature water purifying apparatus includes a dryer disposed in the pressure vessel, wherein

the dryer is provided with a plurality of corrugated plates defining spaces through which a multiphase flow containing radioactive materials flows, and

surfaces of the corrugated plates are coated with TiO_2 or ZrO_2 ~~that serves~~ serving as the ion-exchange material.

13. (previously presented) The nuclear power plant system according to claim 4, wherein the high-temperature water purifying apparatus comprises:

a vessel;

a hollow membrane pipe disposed in the vessel; and

filter aid particles arranged in any one of the following manners in which:

the particles are held on an outer circumference of the hollow membrane pipe;

the particles are coated on an outer circumferences of the hollow membrane pipe; and

the particles are floating about an outer circumferences of the hollow membrane pipe,

wherein the filter aid particles comprise a metal or a metal oxide, which is stable in an environment where high-temperature water or steam exists and is capable of exchanging ions for radioactive ions.

14. (original) The nuclear power plant system according to claim 13, wherein the hollow membrane pipe has porous structures, and diameters of pores in an outer part of the hollow membrane pipe are smaller than those of pores in an inner part of the hollow membrane pipe.

15. (original) The nuclear power plant system according to claim 13, wherein a strainer is disposed outside, inside or inside and outside of the hollow membrane pipe.

16. (currently amended) The nuclear power plant system according to claim 13, wherein the filter aid particles comprise:

a ferrite oxide, ~~such as hematite (Fe_2O_3), magnetite (Fe_3O_4) and nickel ferrite (NiFe_2O_4);~~

oxides containing TiO_2 or ZrO_2 as a principal component; or

a metal or a composite material, for producing the oxide or the oxides, which contains Fe, Ni, Ti or Zr as a principal element.

17. (currently amended) The nuclear power plant system according to claim 13, wherein the hollow membrane pipe is formed of:

oxides containing nickel ferrite (NiFe_2O_4), TiO_2 or ZrO_2 , as a principal components; or

a metal or a composite material, for producing the oxide or the oxides, which contains Fe, Ni, Ti or Zr as a principal element.

18. (currently amended) The nuclear power plant system according to claim 4 further comprising a ~~filtering means~~ filter that reduces an iron concentration of water to 0.1 ppb or below to suppress an increase in differential pressure in the high-temperature water purifying apparatus due to deposition of particles of corrosion products.

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cancel
19. (cancelled)

20. (cancelled)

21. (new) The nuclear power plant system according to claim 7, wherein the ferrite oxide is selected from the group consisting of hematite (Fe_2O_3), magnetite (Fe_2O_4) or nickel ferrite (NiFe_2O_4).

22. (new) The nuclear power plant system according to claim 16, wherein the ferrite oxide is selected from the group consisting of hematite (Fe_2O_3), magnetite (Fe_2O_4) and nickel ferrite (NiFe_2O_4).

23. (new) The nuclear power plant system according to claim 4, wherein the ion-exchange material is adapted to trap thereon radioactive material.

24. (new) The nuclear power plant system according to claim 4, wherein the metal or metal oxide is located on a surface, wherein the surface is adapted to trap thereon

radioactive ions by exchanging ions associated with the metal or metal oxide with radioactive ions.

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25. (new) The nuclear power plant system according to claim 4, wherein the metal or metal oxide is located on a surface, and wherein the surface is adapted to exchange ions associated with the metal or metal oxide with radioactive ions so that the radioactive ions are trapped with the metal or metal oxide.
